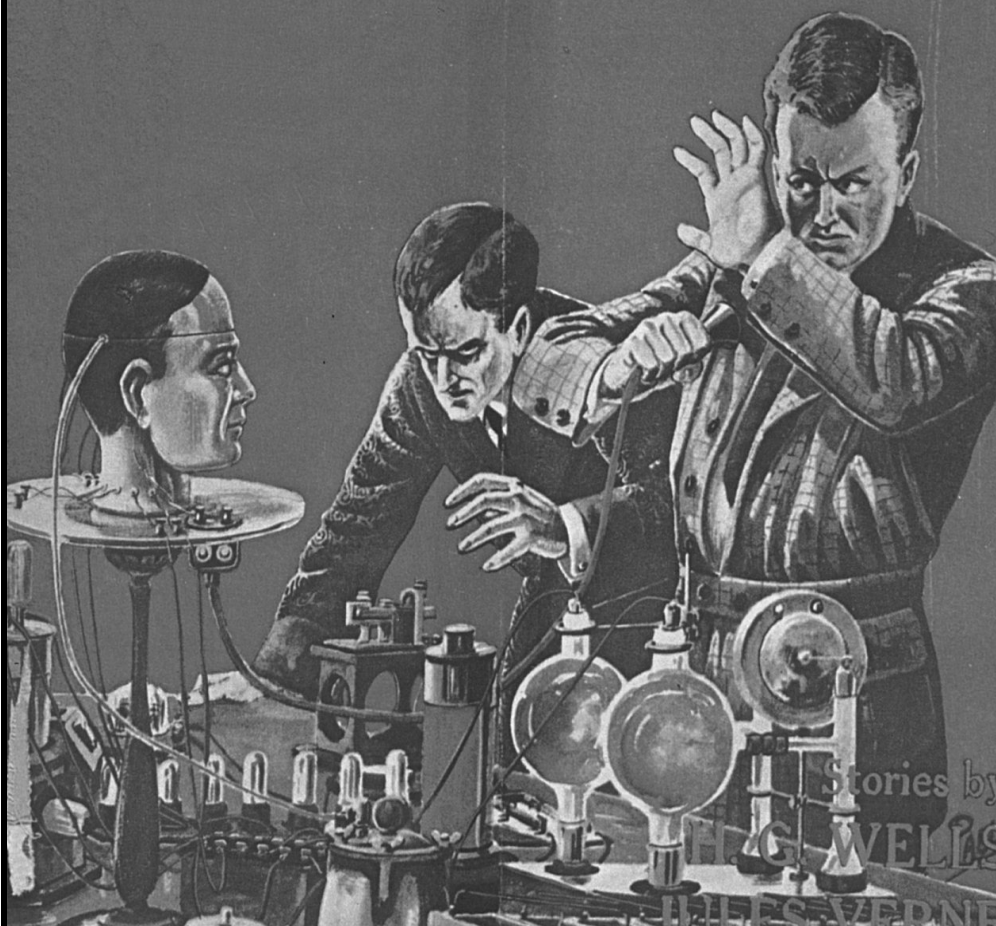


nerdling

Issue #2 April/May 2002



Stories by
H.G. WELLS
JULES VERNE

a zine of physics, maths and sci-fi

It seems that the flag of nerdship is being proudly waved all about us. Triple J's feature album for the last week of April was by a band called N*E*R*D. A comic has been released entitled "Quantum Mechanics". The corner shop sells candy called Nerds. The recent release of Star Wars II has made cinemas neo-meccas for nerddom and cooldom alike.

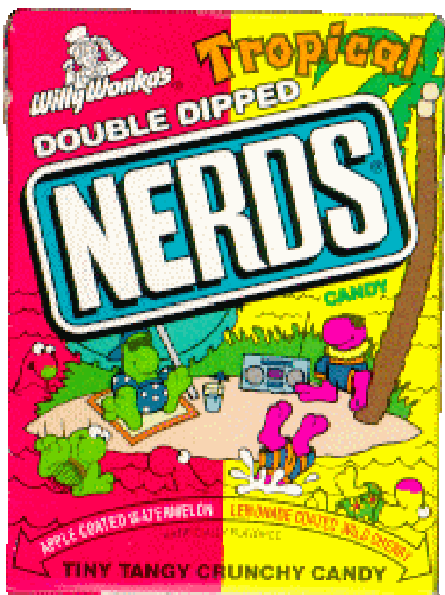
Gasp! What is happening? Are we nerds losing our privileged fringe position in society? Are we becoming assimilated and being robbed of our proud claim to being different? Is *nerd* becoming (shock) *cool*?

No, but the beauty of us nerds is that we don't care. That's our strength.

So: if you're feeling lonely coz your drinking buddies don't understand your love for recreational mathematics, turn to page 6 and dose yourself up on some neat little mathematical paradoxes. Read the confessions of our special celebrity guest nerdling on page 4, or challenge yourself with **nerdling's** Fun Reader Quiz on page 18. And best of all, go to page 17 for your exclusive free nerd accessory—be the envy of everyone everywhere.

To conclude on a note of violin-sound-track nerd patriotism, here is an extract from the website of the band N*E*R*D:

*We call ourselves N*E*R*D because we have a different view of life. A nerd is someone who wants to be cool to everybody but it's not his fault he's smart and his social skills aren't the best. If you ever listen to a nerd speak about their experiences in high school, they tell an ill story. They have an ill perspective because of what they've been through. You ask the average person, the kind of people that would tease nerds in high school, you ask them what their life is like and they'll give this lame, boring story you'll snore to. I don't mind being called a nerd. We are the people who are proud of being smart and being clever when everyone else doesn't understand. That's what we do, that's the flag we're raising and waving.*



Hooray for nerds!
The editor

ubernerdling@yahoo.com.au

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Sighing over Pi

nerdling's special guest celebrity contributor
John O'Connor talks about one of his
close friends, pi.

You are not really a Scientist/Mathematician unless Pi is a close acquaintance. A famous mathematician once described every number as his friend. I have only a few numbers as friends. One is 1729 (for personal reasons, but if you can guess the significance of this number I am willing to present a prize). The other is Pi.

Pi, yes pi, not pie - that well known constant which keeps creeping up everywhere in science, maths, engineering, probability, It has an interesting history. The ancients had a reasonable idea of its value, and as reported in the last issue of Nerdling, politicians tried to simplify life by making it equal to 4! Well it isn't 4. I grew up being told it was $22/7$, then when I matured into a student of mathematics I learnt that it was APPROXIMATELY $22/7$. This was OK for a while but 'approximately' is a term which makes budding scientists and mathematicians uneasy. If we have the technology to make the \$6,000,000 man surely we can do better than this. Then you go to the library and find a book in which someone lists Pi to 100,000 decimal places. I am glad it isn't a book I had to proof read. Worse still it doesn't stop there!

So then comes the use of pi in computer programming - in the days before it was a standard constant in most languages. So you had to remember the constant to about 8 decimal places, unless you were working in double precision in which case you need to remember 3.141592653589793238 ! This is a terrible affliction. It is also taxing on an aging brain!

So what is the alternative? What if you have a calculator which doesn't have pi on it. Well, help is at hand. All you have to remember is 113355 because $355/113$ is accurate to seven significant figures which is surely more than you need for that cheap calculator you are using - it has got to be really cheap if it doesn't have pi! So now the lax or failing of mind can keep pi as a close and valued friend without the hassle of a book or a computer.



In addition to the ways of remembering pi presented by Prof. O'Connor, **nerdling** thinks it's worth mentioning some of the weirder ways. If you've got a lot of patience and some spare time, you can amuse yourself by obtaining pi experimentally.

On a plane, rule a number of equidistant parallel straight lines, distance apart a , and drop a stick of length L on the plane. The probability that it will fall so as to lie across one of the lines is $2L/\pi a$. If the experiment is repeated many hundreds of times, the ratio of the number of favourable cases to the whole number of experiments will be very nearly equal to this fraction: hence the value of pi can be found.

Yes, people have actually tried this. In 1855 Mr A. Smith of Aberdeen made 3204 trials, and deduced $\pi = 3.1553$. A pupil of Prof. De Morgan, from 600 trials, deduced $\pi = 3.137$. In 1864 Captain Fox made 1120 trials and obtained as the mean value $\pi = 3.1419$. *

Once you've tried this for yourself, several thousand times, **nerdling** knows you'll be asking, "What other zany pi-related experiments can I get up to?" and "How can I get my friends involved in pi-madness, too?" Lucky for you, **nerdling** has the answer.

Invite all your friends around, and get them to write down two numbers at random. It has been shown that the probability that they will be prime to each other is $6/\pi^2$. In one case **, when a lecturer got his class of 50 students to each write down 5 pairs of numbers at random, 154 of the pairs were found to consist of numbers prime to each other. This gives $6/\pi^2 = 154/250$, from which we get $\pi = 3.12$.

*Want proof? See A. De Morgan, "Budget of Paradoxes", London, 1872, pp. 171, 172; and "Messenger of Mathematics", Cambridge, 1873, vol II, pp. 113, 114.

** More proof in R. Chatres, "Philosophical Magazine", London, series 6, vol 39, March 1904, p. 315. (References listed in "Mathematical Recreations and Essays", by W. W. Rouse Ball, who is the doyen of mathematical nerdship and a hero of **nerdling's**.)

A/Prof John O'Connor is the head of the School of Physics and Mathematics at the University of Newcastle, and the current president of the Australian Institute of Physics. He is the local science guru of ABC Newcastle Radio, and has been a panelist at Newcastle's two *Science in the Pubs*, once with Douglas Adams. Now that he's a **nerdling** contributor, he's *really* famous.

THE

PAGE

OF

LIES

Believe them at your own peril.

LIE

1

Proof that $1 = 0$

Let $a = 1$. (✖)

Square both sides:

$$a^2 = 1$$

Subtract 1 from both sides:

$$a^2 - 1 = 0$$

Factorise the left hand side:

$$(a-1)(a+1) = 0$$

Divide both sides by $(a-1)$:

$$(a+1) = 0$$

From ✖, substitute $a = 1$:

$$\begin{array}{l} 2 = 0 \\ 1 = 0 \end{array}$$

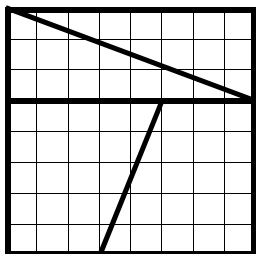
Divide both sides by 2:

LIE

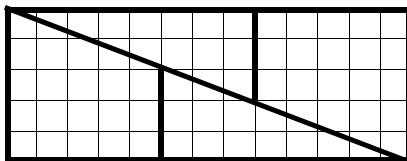
2

Proof that $64 = 65$

Take a square of paper subdivided like a chess board into 64 small squares. Cut it into four pieces along the lines indicated in the figure below.



Now rearrange these four pieces into the shape of a rectangle as shown below.



To keep you sane, the 'answers' will be published in next issue of **nerdling**.

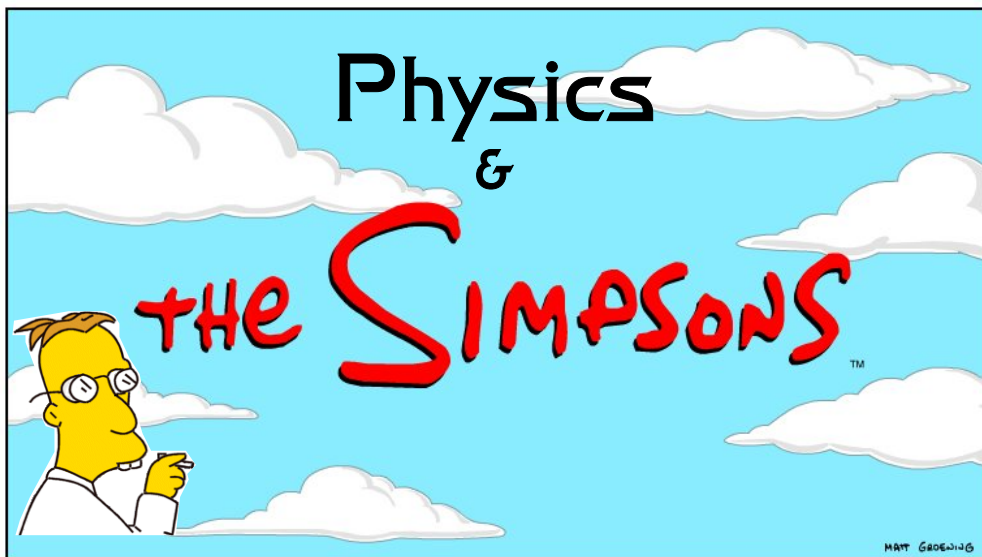
From this to this in
under four weeks!



One of our many satisfied
readers says:

"Before I found **nerdling**, all
I could talk about was sport
and fashion. Now I am able to
discuss non-Euclidian
geometry with my friends and
family.

"Thank you, **nerdling**!"



Stephen Hawking called *The Simpsons* "one of the cleverest shows on television". He liked it so much he made a cameo appearance. And someone who actually understands wormholes has got to be right, right?

Right, says a guy called Robert P. Crease, who wrote an article on the TV series for *Physics World* magazine in January, 2001. In his article, he lists a number of the ways in which science appears in the Springfield universe, and the 'morals' conveyed through the stories: for example, when zoologist Stephen Jay Gould is asked to debunk a purported angel fossil, the townspeople's reactions are a vehicle for satirical statement on the science versus religion debate. "Science is like a blabbermouth who ruins a movie by telling how it ends," says Homer's religious next-door neighbour. Or when an observatory detects a comet that almost wipes out the town of Springfield, the residents' first reaction is "Let's go burn down the observatory so this will never happen again!" - and the town's ethos is described by a newscaster: "Never give up and never think things out."

Ultimately, though, Robert Crease concludes that "if Springfield's residents can relate to science at all, it is at the level of relating to a cartoon character or baseball game." He cites an episode when Homer is pressed to name a scientist, and replies: "Batman".



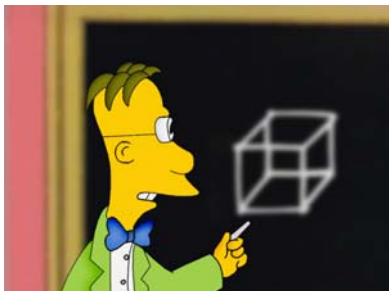
It is in this same spirit that **nerdling** brings you, over the next few

pages, a selection of physics quotes and inventions from *The Simpsons*—mainly from the cult hero Professor John Frink, the resident mad scientist.

In the words of Bart: "Hurrah for science. Wool!"

Read Robert Crease's article at <http://physicsweb.org/article/world/14/1/2>

Frink explains the theory of the third dimension.



Lisa: Well, where's my Dad?

Frink: Well, it should be obvious to even the most dim-witted individual who holds an advanced degree in hyperbolic topology, ng-bwui, that Homer Simpson has stumbled into the third dimension. Here is an ordinary square...

Wiggum: Whoa, whoa. Slow down, egghead!

Frink: ...but suppose we extend the square beyond the two dimensions of our universe along

the hypothetical Z axis, there. (Frink draws a wireframe cube on the blackboard.)

Everyone: (Gasps).

Frink: This forms a three-dimensional object known as a "cube", or a "Frinkahedron" in honor of its discoverer.

Homer tries to explain what the third dimension looks like.

Homer: Uh... it's like... did anyone see the movie 'Tron'?

Hibbert: No.

Lisa: No.

Marge: No.

Wiggum: No.

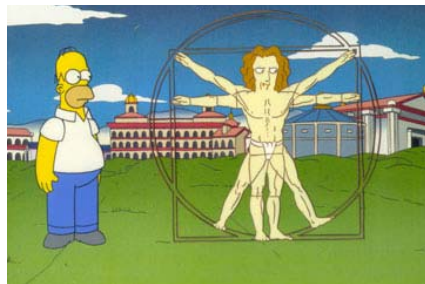
Bart: No.

Patty: No.

Selma: No.

Frink: No.

Wiggum: Yes. I mean... um, I mean, no. No, heh.



Frink points at the villains:

Quimby: Settle Down People. As we speak, Chief Wiggum is tracking down those little squealers using the latest in crime fighting technology.

Wiggum: Ah, I got nothin, how bout you Frinky?

Frinky: I have captured the signal and am presently triangulating the vectors and compressing the data down in order to express it as a function of my hand... They're Over There!

Frink as the mathematician from Jurassic Park:

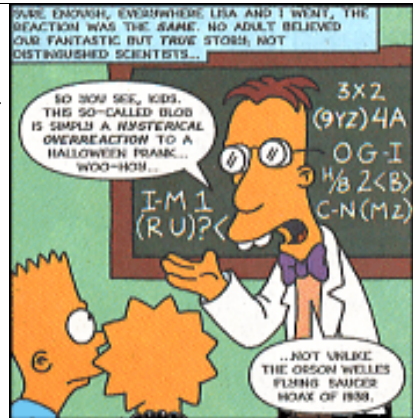
Frink: You've got to listen to me. Elementary chaos theory tells us that all robots will eventually turn against their masters and run amok, in an orgy of blood and the kicking and the biting with the metal teeth and the hurting and shoving.

Scientist: How much time do we have professor?

Frink: Well, according to my calculations, the robots won't go berserk for at least 24 hours.

[All robots turn against the humans]

Frink: Oh. I forgot to carry the one.



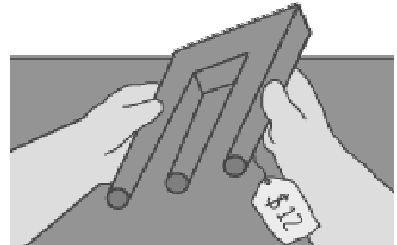
Frink invents a new type of candy:

Frink: As you can see, I have created a lemon ball so sour it can only be safely contained in a magnetic field. The candy, known as 77X42... Bwei... Where the hell is the candy?

Homer: I don't know.

Frink being a genius:

Professor Frink: We studied traffic patterns and found that drivers move the fastest through yellow lights, so now, we just have the red and yellow lights.

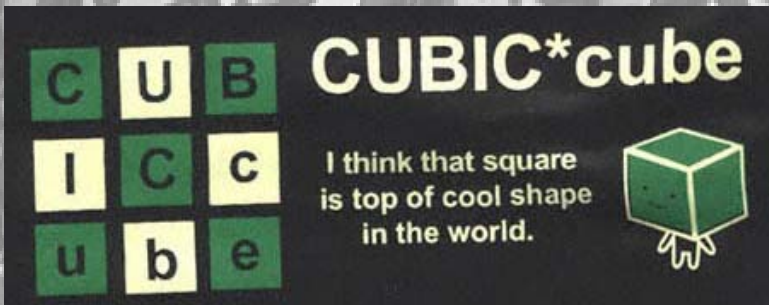


*One of Frink's inventions:
The "poiuyt"*

quotes

“If I drop dis spliff, it will fall to da Earth, coz of someting dat lives in de air called da Science.”
—Ali G.

“No one's really gonna to be free until nerd persecution ends.”
—Gilbert Lowe, “Revenge of the Nerds”



Label from a Japanese Product

“Dust is the most beautiful thing you can imagine.”
— David Malin, speaking at the recent Newcastle
Science in the Pub

“The dinosaurs did not have a space programme. That is why they died out.”

— Duncan Steele, on *60 Minutes*

Astronauts are space travelers, but they don't fly around the universe as easily as Superman.

DUBIOUS SCIENCE OF THE MONTH

Bio-Magnetic Therapy

A catalogue was recently sent to **nerdling** by a concerned reader, who was fascinated by the number of magnetic "health products" being flogged to poor helpless old ladies (the catalogue was sent to her household with a Bowling Association Magazine). Let's hope these old ladies haven't discovered modern technology, otherwise their computer files are going to get wiped whenever they walk past...

Can magnetic fields really help to "improve circulation and reduce swelling, stiffness and pain"? The ads say it is "believed to work". Compelling evidence, oooh. Maybe the salesmen will defend themselves by mentioning the Baylor Study, an experiment carried out in 1997 which concluded that permanent magnets reduce pain in post-polio patients. (Both of the experimenters were known to be strong advocates of magnetic therapy even before the test.) Certainly they won't mention the work of Hong in 1982 which showed that magnetic necklaces produced no relief of neck or shoulder pain, or tests carried out in 1984 by Barker which found that magnetic bone therapy machines worked just as well when they were turned off, as they did when they were on. Nor will they risk confusing you with figures, by letting you know that the average magnetic field at the magnet's surface is only about 100 times stronger than the Earth's magnetic field, and that by the time it's gone through all that fabric and penetrated a millimetre or so into your skin, it'll be tens of thousands of times weaker...

If companies want to flog magical magnetic therapies, then the onus is on them to prove that they really work. So far, **nerdling** isn't convinced.

P.S. If you read all the adverts below and find yourself getting swayed by their subtle methods of persuasion, a final reason to think twice before handing over your money: my grandma splurged out and bought the magnetic knee pads, the magnetic patches, the magnetic slippers and the magnetic neck wrap—and then made the mistake of getting up in the night to raid the fridge. It took two whole days before someone found her and managed to prize her off the fridge door.

Magnetic Watches

Magnetic Mattress
Receive magnetic therapy while you sleep!

Magnetic Elbow Support
Magnetic Back Support

Magnetic Knee Support

Magnetic Neck Wrap
20 Hidden Magnets

only \$19.95

Magnetic Pillow Shoes

Magnetic Ankle Support

only \$29.95

Magnetic Health Set
8 Piece

Magnetic health set therapy has been used for centuries to help stimulate circulation, reduce swelling and ease stiffness. Included are back belt (with strategically placed magnets), 3 arm belts, 2 small magnetic discs and 2 larger magnetic discs

#10120 8 Piece Health Set

only \$29.95

is made of genuine suede leather. Two strong magnets embedded in the sole give magical "magnetic therapy". Available in beige and dark brown.

Magnetic Patches
Set of 20
Water-resistant

Our price \$14.95

Magnetic Suede Slippers

Electronic Rooster
Greet Your Guests Automatically

Not magnetic, but pretty funny anyway

cervical areas. Magnetic therapy has been used for centuries to help stimulate circulation, reduce stiffness and ease pain. With adjustable

theclubsandsocietiespage

☞ **nerdling** takes a critical look at Mensa ☞

Mensa is an elitist organisation. They are an international society of intelligent people, the only prerequisite for membership being a score in the top 2% of the population in an IQ test. They list their aims as providing a good social environment for their members, carrying out research into intelligence, and setting up programmes to help gifted and talented children. They have chapters in many countries around the world, and lay claim to many well-known members, such as actress Gina Davis.

Mensa is quick to acknowledge and defend their elitism. On the website of Mensa's Australian chapter [www.au.mensa.org], they say they're elitist only in the same way that a football team or jazz band or university is elitist. In this way, they imply that we should think of Mensa in the same warm and fuzzy way we think about the Newcastle Knights or whoever—that it's simply a case of the best people getting the spot on the team. But the football team isn't selected on the basis of their inherent physical propensity to become a good footballer: to get onto the team, you've got to have more than a wide neck and big shoulders. You've got to be disciplined enough to get out onto the field every day whether it's early or late or raining; you've got to have enough dedication to keep going despite setbacks or exhaustion. Even though having a father who was a great footballer might help your chances of being good at the sport yourself, on its own it isn't enough. Football—just like playing jazz or getting to university—is just as much (and perhaps more) to do with *who* you make yourself, rather than *what* you are.

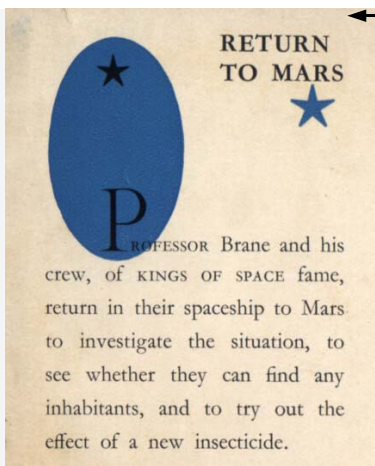
This is where Mensa differs. To get into Mensa, all you've got to do (apart from being able to afford the \$35 testing fee and the \$80 annual membership fee) is pass a recognised IQ test under controlled conditions. These IQ tests are largely based on things like pattern recognition, the aim being to test someone's *potential* rather than *achievement*. There is certainly a place for such tests, such as to assess a child in order to determine the best method of educating them. However, when IQ test results are used to draw a dividing line through society, different issues arise. Over the years many works of fiction have explored these issues, ranging from the film *Gattaca* to the novel "Player Piano" by Kurt Vonnegut.

In the end though, Mensa is just a club, provided for people who like that sort of club—and it is quite natural to believe that smart people would in general enjoy the company of other smart people. But does that require joining a special 'smart club'? One could assume that a smart person, just through doing what they love, will eventually be brought into contact with other smart people who happen to share the same interests. Two people sharing the artificial criterion of 'brightness' is no guarantee that they'll *like* each other, or even have anything interesting to say. As a Canadian friend related of his only attendance at a Mensa meeting, "[I was] disappointed, maybe I got a bad lot, all they talked about were taxes, old TV shows and that they'd heard from so-and-so who now lives in East Yuhonga. I told them I liked physics and philosophy (only post-modernist) and language and one came up with a physics joke (I'd already heard), one started to speak in Spanish (??) and another asked me to define postmodernism-she was OK..."

nerdling doesn't have anything against Mensa; it's just that we can't see much *for* it. Are you a member of Mensa? Enlighten us by sending your comments to ubernerdling@yahoo.com.au

The nerdling 60-second guide to IDENTIFYING BAD SCI-FI

Nothing can beat a really good sci-fi story—but sometimes, finding a piece of unbelievably dodgy science fiction can be almost as rewarding. Follow the seven-step guide for hints on how to identify classically cringeworthy works.



3. For good sci-fi, it is essential to have both literary merit and solid scientific content. Often sci-fi is bad because it leaves out any vestiges of good science. But sometimes, the balance can fall the other way...

1. Check the blurb on the back of the book first. If bad science appears even there, then you're in for a veeery entertaining read.

2. Beware of the token romance. It's normally chucked in to keep the girlfriends of the sci-fi nerds happy, so they won't complain as much about being made to watch another spaceship movie. Be careful though—sci-fi romance stories invariably suck.



22 TOM SWIFT AND HIS G-FORCE INVERTER

"It worked, Bud! I used my supervolt separator to decompose the gas. By using a small sample of Serptilium having ninety-nine per cent of the ortho form and one per cent of the para form, I found that each of them liquefied in their divided state at -440 degrees Fahrenheit. The ortho form definitely has the antigravity property which increases when heated."

"Tremendous!" Bud exclaimed.

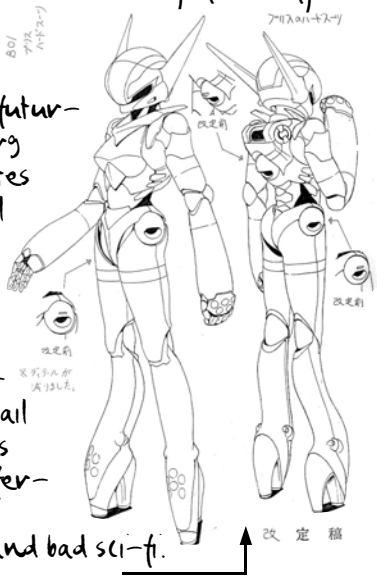
198 GULLIVER'S TRAVELS

I was at the mathematical school, where the master taught his pupils after a method scarce imaginable to us in Europe. The proposition and demonstration were fairly written on a thin wafer, with ink composed of a cephalick tincture. This the student was to swallow upon a fasting stomach, and for three days following eat nothing but bread and water. As the water digested, the tincture mounted to his brain, bearing the proposition along with it. But the success hath not hitherto been answerable



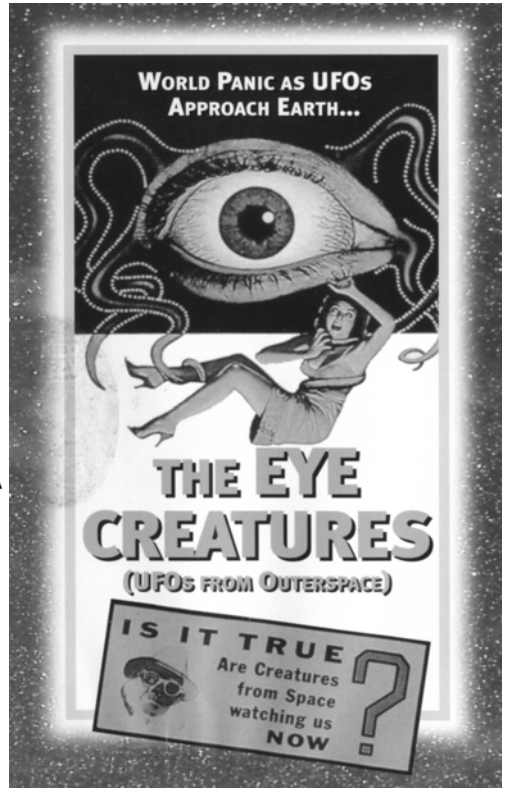
4. The semi-naked woman being attacked by the evil alien is an instant way of identifying bad sci-fi. Run for your life.

5. This band of futuristic female cyborg kung-fu vigilantes have to fight evil corporations and rampaging super-robots in high heels, yes. Attention to detail can sometimes mean the difference between good and bad sci-fi.



6. Classically dodgy sci-fi will have several easily identifiable things going for it: vague hints at conspiracies, over-use of dramatic cliches, cover art that has nothing to do with the movie, titles that take you to new limits of agony, oh, and the obligatory scantily-clad woman in distress.

7. One of the best types of sci-fi is the stuff that rips itself off, thus saving you time and effort. Many an amateur critic has come unstuck by failing to identify the irony. A sample is provided here for you to practice your skills of irony detection.



The Rimmer and Lister Awards

For Good and Bad Pop Science

April/May 2002



A Rimmer Award to George Lucas for the astoundingly bad ‘romance’ between Amidala and Anakin. [c.f. Point 2, page 14.] “I hate sand... It gets everywhere; not like you.” O...kay. It’s a good thing that....



... Yoda and the sound effects and the chase scenes and the light saber fighting make up for the dud bits. **A Lister Award** to Episode II for being a lot better than Episode I—and for restoring a bit of our faith in Star Wars.

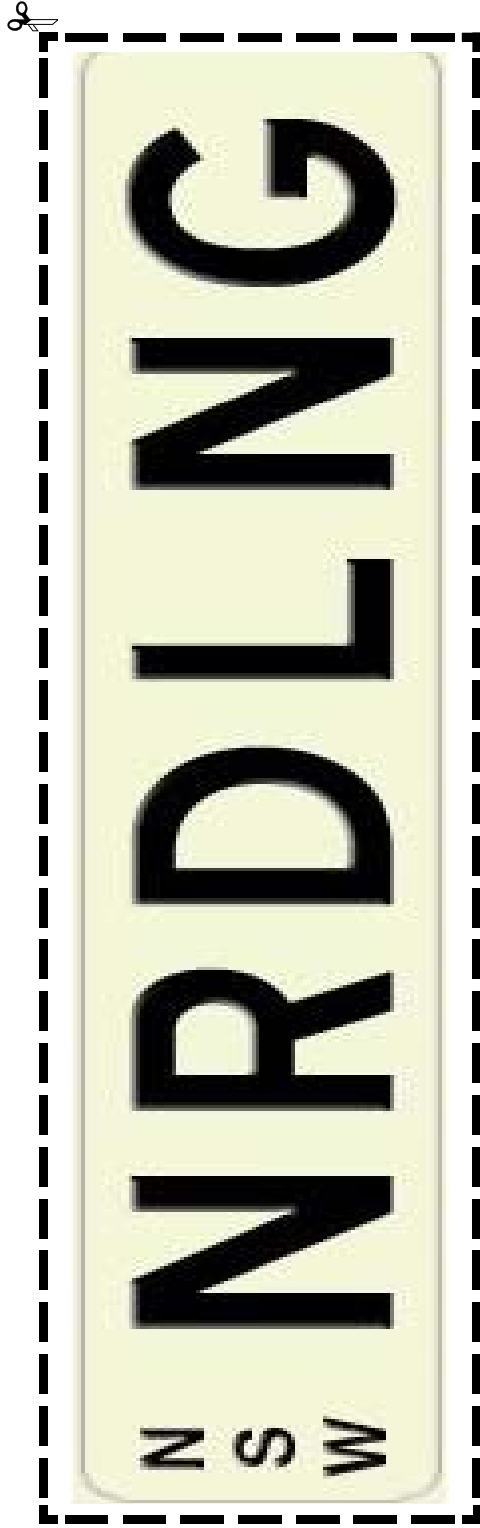


A Lister Award for the comic series shown here, sent in by Brian King, **nerdling’s** resident quantum mechanics consultant and general genius. We’re waiting for series II: Inorganic Chemistry.



Free nerd accessory — Exclusive for readers of nerding

Just cut it out and stick it over your existing number plate!
It's perfectly legal!*



* Trust us.

Fun Reader Quiz

Sick of all the 'holiday puzzles' put out in other magazines? Forget those pissweak find-a-words and sink your teeth into **nerdling's** fun reader quiz.

1. Explain how the 'backwards triangle inequality' of Lorentzian geometry allows the hyperbolic angle to be defined between two forward-pointing timelike vectors.
2. Show how this angle is interpreted in terms of relative velocity.
3. Explain the phenomena of time dilation and Lorentz contraction in terms of the hyperbolic angle between two observers.



Send your answer to: **ubernerdling@yahoo.com.au**

The winner will be announced in the next issue.

The judge reserves the right to award first place to whichever answer he/she like the most, regardless of correctness.

OH LORD DON'T LET THEM DROP THAT ATOMIC BOMB ON ME

CURRENT AFFAIRS

The mind-bending genius of Beckham

20/05/2002; news.telegraph.co.uk

The England captain's brain converts multi-variable physics calculations into football magic.

David Beckham is not known for his intellectual prowess. But academic scrutiny, published yesterday, of the art of "bending it like Beckham" concludes that the England captain is the Einstein of football physics.



David Beckham pauses to calculate the optimal turbulent-laminar transition trajectory before scoring against Greece

Does the Telegraph know that seals can catch balls on their noses? Better not let the journos know, or they'll give them a PhD.

Surgery creates cyborg

LONDON: Surgeons have carried out an operation on a cybernetics professor so that his nervous system can be wired up to a computer.

Professor Kevin Warwick, 48, the world's first cyborg (part human, part machine) hopes that readings can now be taken from the implant in his arm of electrical impulses coursing through his nerves.

These signals, encoding movements such as wiggling fingers and feeling shock and pain, will be transmitted to a computer.

It is hoped that the procedure could lead to a medical breakthrough for people paralysed by spinal cord damage.

Professor Warwick

Cricket strikes

Cricket logic for science

Industrial disaster four-fold in January.

of Statistics' and there were to industrial increase of

involved

structures of large

were pre-

PRIME Minister John Howard vowed yesterday to work towards bringing to the Australian scientific community the same world acclaim the Australian cricket team receives.

Mr Howard said the work of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) was equal to the cricket team, which was named the best team in the world on Tuesday.

'I believe that, in so many ways, the team achievement of the CSIRO in the world of science is as meritorious and praiseworthy as the team achievement of the wonderful Australia cricket team.'

It's official: the CSIRO has almost as much merit as the Australian Cricket Team. Glad that our national leader can keep things in perspective for us.



10,000 nerds can't be wrong!
Join the **nerd**ling cult

ubernerd1ing@yahoo.com.au